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Veröffentlichungsversion / Published Version  
Zeitschriftenartikel / journal article

### Empfohlene Zitierung / Suggested Citation:

Dutra, D. D., Duarte, M. C. S., Albuquerque, K. F. d., Santos, J. d. S., Simões, K. M., & Araruna, P. d. C. (2017). Adverse events in Intensive Care Units: bibliometric study. *Revista de Pesquisa: Cuidado é Fundamental Online*, 9(3), 669-675. <https://doi.org/10.9789/2175-5361.2017.v9i3.669-675>

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## Eventos adversos em Unidades de Terapia Intensiva: estudo bibliométrico

Adverse events in Intensive Care Units: bibliometric study

Los eventos adversos en Unidades de Cuidados Intensivos: estudio bibliométrico

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### How to quote this article:

Dutra DD; Duarte MCS; Albuquerque KF; et al. Adverse events in Intensive Care Units: bibliometric study. Rev Fund Care Online. 2017 jul/sep; 9(3):669-675. DOI: <http://dx.doi.org/10.9789/2175-5361.2017.v9i3.669-675>

### ABSTRACT

**Objective:** To investigate the scientific productions about the adverse events that occurred in Intensive Care Units. **Methods:** Bibliometric study, quantitative approach of documentary base, consisting of 20 articles from the electronic database Scientific Electronic Library Online (Scielo) and Specialized Bibliographic database in the area of nursing (BDENF), and thesis and dissertations database in the period of 2004 to 2014. **Results:** It was possible to identify scientific productions about adverse events in ICUs of the last 10 years, highlighting the predominance of papers published by nursing, especially AEs related to medication errors and nosocomial infection, intensified by the overload of work. **Conclusion:** The study presents limitations as to the number of publications on the subject. Thereby the scarcity of publications regarding the subject in question, makes updates on the subject.

**Descriptors:** Iatrogenesis, Intensive Care Units, Nursing, Patient Safety.

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## RESUMO

**Objetivo:** Investigar as produções científicas acerca dos eventos adversos ocorridos em Unidades de Terapia Intensiva. **Métodos:** Estudo bibliométrico, abordagem quantitativa, de base documental, constituído por 20 artigos da base de dados eletrônica Scientific Electronic Library Online (Scielo), Base de Dados Bibliográficos Especializada na Área de Enfermagem (BDENF), e banco de teses e dissertações no período de 2004 à 2014. **Resultados:** Foi possível identificar produções científicas acerca de eventos adversos em UTIs dos últimos 10 anos, ressalta a predominância de trabalhos publicados pela enfermagem, com destaque para EAs relacionados a erros de medicação e infecção nosocomial, intensificados pela sobrecarga de trabalho. **Conclusão:** O estudo apresenta limitações quanto ao número reduzido de publicações sobre a temática. Desse modo a escassez de publicações no que concerne à temática em questão, dificulta atualizações sobre o assunto. **Descritores:** Iatrogenia, Unidades de Terapia Intensiva, Enfermagem, Segurança do Paciente.

## RESUMEN

**Objetivo:** Investigar las producciones científicas acerca de los eventos adversos ocurrieron en Unidades de Cuidado Intensivo. **Métodos:** Estudio bibliométrico, enfoque cuantitativo base documental que consta de 20 artículos de la base de datos electrónica Scientific Electronic Library Online (Scielo) y base de datos bibliográfica especializada en el área de enfermería (BDENF) y base de datos de tesis y disertaciones en el período 2004-2014. **Resultados:** Se logró identificar producciones científicas sobre eventos adversos en UCI de los últimos 10 años, destaca el predominio de artículos publicados por enfermería, especialmente EAs relacionados con errores de medicación y la infección nosocomial, intensificado por la sobrecarga de trabajo. **Conclusión:** El estudio presenta limitaciones en cuanto al número de publicaciones sobre el tema. Tal modo la escasez de publicaciones sobre el tema en cuestión, hace actualizaciones sobre el tema. **Descriptores:** Iatrogenesis, Unidades de cuidados intensivos, Enfermería, Seguridad del paciente.

## INTRODUCTION

Iatrogenic occurrence or Adverse Event (AE) according to the classification of the National Accreditation Organization (ONA) can be defined as the negative result to the health care practice of medical, nursing and all staff involved in the care.<sup>1</sup>

Adverse event (AE) is defined as unintentional injury resulting in temporary or permanent disability and/or extending the length of stay or death as a result of the care provided.<sup>2</sup>

The first records of iatrogenic date back to ancient civilizations and are considered undesirable events, unplanned, that cause or has the potential to cause harmful results to the physical or mental condition of the patient, and may or may not be the result of negligence or professional failure involved with assistance.<sup>3</sup>

Authors<sup>4</sup> add that iatrogenic occurrences can be understood as complications, errors, adverse events, among other denominations, and characterize undesirable events, unintentional, that can negatively affect the quality of treatment and may worsen their medical condition and

cause temporary damage, or even permanent or death, especially in intensive care units.

The Intensive Care Unit (ICU) is a place where the adverse events deserve particular attention, taking into account that the severe patient has characteristics that make it more vulnerable to errors. However, they should be explored to identify structural problems, human resources, materials, equipment and work process to watch preventive measures failures in the hospital context.<sup>5</sup>

In Intensive Care Units clinical conditions are more severe and the patient is much more dependent on nursing care. These events can represent greater clinical risk and results negative indicator of quality of care.<sup>6</sup>

Nurses are responsible for intensive care of the person in various critical situations, in an integrated and continuous manner with members of the healthcare team, thus the intensive care unit nurses need to think critically analyzing problems and seeking solutions to them, ensuring always his/her practice within the ethical and bioethical principles of the profession.<sup>7</sup>

The ICU has factors that can increase the risk of iatrogenic occurrences, such as the wide variety of medications and technical procedures that are performed, the large number of professionals who provide care to patients, the use of complex equipment, the unit's own work dynamics, combined with the severity of clinical symptoms of most patients.<sup>4</sup>

In addition to the damage caused to the patient, the professional author of iatrogeny well as those who are co-authors of the responsibility he/she has in the team are also likely to suffer implications of this type of event, for administrative and legal penalties. Among these professionals it is highlight the nurse, for their control activities and monitoring the patient and the nursing staff, especially in intensive care units.<sup>8</sup>

The lack of educational methods provides a higher incidence of adverse events, as the professional fears the case of sub-notified punishment and then make the mistake again.<sup>9</sup>

Please note that the nurses and all professionals should recognize the limitations involved and seek to overcome them, providing advances and expanding clinical studies to support the professional practice.

In recent years it has sparked the interest of health institutions to improve safety in the provision of care, especially for discussions on quality management in health care.<sup>10</sup>

The World Health Organization (WHO) in 2004, expressing concern about the situation, created the World Alliance for Patient Safety (World Alliance for Patient Safety). The objectives of this program, (now the call-up Patient Safety Program/Patient Safety Program) were, among others, to organize the concepts and definitions of patient safety and propose measures to minimize the risks and mitigate the adverse events.<sup>11</sup>

As for the actions to reduce the risks of AEs, WHO prioritized two which were called global challenges: to reduce infection associated with health care through hand hygiene

campaign and promote safer surgery by adopting a list of check before, during and after surgery. Other solutions that have been stimulated by WHO, including: avoid mistakes with medications; avoid exchange of patients to provide any care - administer medication, spoon sample for examination, infusing blood bag and etc; ensure proper communication during the transmission of the case; remove the concentrated electrolyte solutions of inpatient areas of patients and monitor their use; create mechanisms of control of concentrated electrolyte solutions; avoid bad pipe connection, catheters and syringes; and use disposable syringes.<sup>11</sup>

In April 2013, the Ministry of Health and Anvisa launch the National Program for Patient Safety, aimed at reducing the incidence of AE in health services, which are high, but mostly preventable.<sup>12</sup>

Administrative Law MS/GM No 529/2013 provides that a set of basic protocols defined by the WHO should be designed and implemented: the practice of hand hygiene in health facilities; safe surgery; safety in prescription, use and administration of medicines; patient identification; communication in health establishments of environment; preventing falls; pressure ulcers; transfer of patients between care points; and safe use of equipment and materials.<sup>11</sup>

Thus, there is interest in doing a bibliometric study of the productions about the adverse events in ICUs, considering the need to spread the development of adverse events in ICUs to improve the quality of nursing care.

Given the above, the question arises: What is the characterization of scientific production inherent in AE occurrences in ICUs?

In this perspective, the objective of the study was to investigate the scientific production about AEs occurred in Intensive Care Units.

## METHODS

This is a bibliometric study, descriptive and quantitative approach, document base, whose unit of analysis was constituted by published articles related to Adverse Events occurring in intensive care units.

Bibliometry allows an objective evaluation of the scientific production and is used in various fields of scientific knowledge.<sup>13</sup> Have agreed to emphasize that the bibliometric indicators are used to evaluate the results of investments in research, production of scientific papers, patents, and to respond to questions on the impact of research in the scientific community.<sup>14</sup>

The bibliographic survey was carried out in the electronic database, the Scientific Eletronic Library Online (Scielo) and Database Resource Specializing in the Nursing Area (BDENF), considered the main area of the Brazilian health-related theme and thesis and dissertations of banks as UFMG Digital Library and Digital Library of Theses and Dissertations of USP.

Data collection occurred in the month April 2015, with the inclusion criteria for the sample selection: publications that addressed adverse events in intensive care units in context, published from 2004 to 2014, and made available in Portuguese. They were used as descriptors the terms "adverse events and nursing", "intensive care unit", "patient safety" and "iatrogenic", identifying 20 articles.

To facilitate the analysis of publications, it was used for data collection tables prepared by the author, covering items related to the study: Database, year of publication, published periodical training area of the authors, title of the authors of the research mode, goals and used descriptors.

The data from quantitative questions were statistically analyzed by percentage and presented through graphical representations.

The statistical method to be used was descriptive statistics. This is a method of a simple collection of information and its presentation in statistical tables, limited to presenting the data and graphics of a given phenomenon.<sup>15</sup>

## RESULTS AND DISCUSSION

This item discusses the results obtained in terms of objectives, thus these will be explained and analyzed in the form of tables and figure.

The sample was composed of 20 articles about the adverse events in the ICU. There was a prevalence of 10% (50) of articles published in the Scielo database, most of the analyzed studies were published between the years 2010 and 2013, in Brazil, in São Paulo, performed by nurses, who used more often the methodology of quantitative type.

The distribution of articles in relation to the journals will be presented in Table 1.

**Table 1** - Distribution of articles in relation to periodicals

Periodical	N	%
Digital Library of Theses and Dissertations of USP	04	20
Latin American Journal of Nursing	03	15
Brazilian Journal of Nursing (REBEN)	02	10
USP School of Nursing Journal	01	05
Brazilian Journal of Intensive Care	01	05
Brazilian Journal of Nursing	01	05
Journal Pediatrics journal	01	05
Brazilian Society for the Advancement of Science (SBPC)	01	05
UFMG Digital library	01	05
Scientific journal of nursing (RECIEN)	01	05
UFPE nursing online journal	01	05
Interdisciplinary journal of PUC Minas in Barreiro	01	05
Nursing Electronic Journal of Nursing and Nutrition Research Centre	01	05
International Journal of Intensive Care (RBTI)	01	05

Source: Researcher's data, 2015.

The predominant periodic publications about the topic discussed was the Theses and Dissertations Digital Library of the University of São Paulo 04 (20%). This was established in 2001 in order to provide the Internet work defended at the University of São Paulo (USP), allowing the dissemination of scientific knowledge through the digital publication of theses and dissertations.<sup>16</sup>

Followed by Latin-American Nursing Journal (RLAE) with 03% (15) to RLAE characterized as a national journal, international movement which had its first edition published in January 1993. It is the official scientific publication of the University of São Paulo in Ribeirão Preto School of Nursing, WHO Collaborating Centre for the Development of Nursing Research. Its first edition was published in January 1993 and aims to publish scientific research results in nursing and other areas of interest to health professionals. The printed version is issued in English and the electronic version in Portuguese, Spanish and English. RLAE is affiliated with the Brazilian Association of Scientific Editors - ABEC and indexed in national and international databases more important.<sup>17</sup>

The distribution of the studies and the database can be seen below in Table 2.

**Table 2** - Distribution of articles in relation to the database and digital libraries

Database / Digital Libraries	N	%
Scielo	10	50
Biblioteca digital da USP	04	20
Sociedade Brasileira para o Progresso da Ciência (SBPC)	01	5
Biblioteca Digital da UFMG	01	5
Revista Científica de Enfermagem	01	5
Biblioteca Digital da UFPE	01	5
Biblioteca Digital da PUCMG	01	5
Revista Eletrônica de Enfermagem do Centro de Estudos de Enfermagem e Nutrição	01	5

Source: Researcher's data, 2015.

Concerning the database/digital library there was a predominance of the base Scielo 10 (50%). That began in Brazil in 1998, after a one-year pilot project in partnership with the Foundation of São Paulo (FAPESP) and the Latin American and Caribbean Center of Information in Health Sciences (BIREME/PAHO/WHO). Scielo had two simultaneous objectives. The first was to develop expertise and infrastructure to index and publish on the Internet a selected set of Brazilian journals from different disciplines that adopt peer review, and dealing with texts in several languages. The second was to increase the visibility, usage and impact of indexed journals and research they publish.<sup>18</sup>

The studies found related to Adverse Events in the ICU according to the geographical origin are exposed soon below in Table 3.

**Table 3** - Distribution of studies regarding the geographical origin can be seen below in the table

Geographical Origin	N	%
São Paulo	09	45
Belo Horizonte	03	15
Bahia	01	05
Maranhão	01	05
Ribeirão Preto	01	05
Midwest Region	01	05
Rio Grande do Sul	01	05
Goiânia/GO	01	05
Greater Porto Alegre	01	05
Recife	01	05

Source: Researcher's data, 2015.

It is observed that 65% (13) of the articles are published in the southeastern region, highlighting the paucity in other regions.

The predominance of scientific production in the Southeast is not recent, studies conducted in 2003 already indicated these results. According to these researchers, the concentration is associated with dominance in Southeast of higher education institutions, with their graduate programs and human resources, with the support of policies and science and technology programs implemented by FAPESP in the case of São Paulo, and federal government agencies, such as CNPq, Capes and the Financier of Studies and Projects (Finep).<sup>19</sup>

As for titration and training of the factors responsible for the publications of studies, they are exposed soon after.

**Table 4** - Distribution of studies on the area of training of authors

Training Area of Authors	N	%
Nurses	16	80
Doctors	04	20

Source: researcher's data, in 2015.

Work on screen, there was a predominance of works published by nurses and medical professionals.

Nurses were the professionals who conducted more research concerning the topic (80%), being post-graduate the majority, and then follows the medical category with 20%. This result can be explained by the fact theme is closely related to the everyday practice of nursing. Great AEs numbers occur with the direct involvement of the nursing team, as seen in other studies.<sup>20</sup>

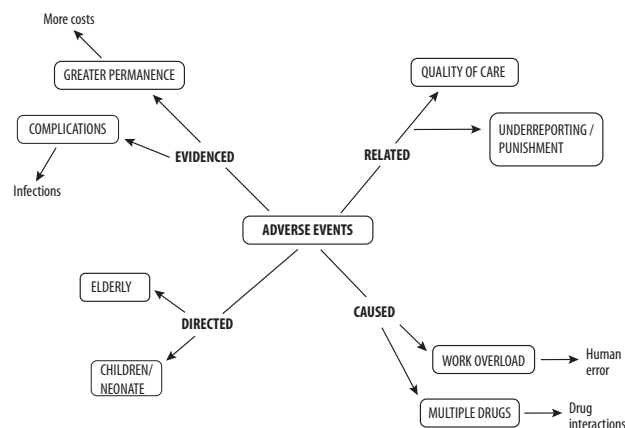
However it is noted the ineffectiveness of other professionals involved in research, since the patient is assisted by a multidisciplinary team, and all are subject to errors. It is important to encourage multidisciplinary production involving this issue because on many occasions,



the occurrence of EA is multifactorial, involving more than one team member.

Regarding the distribution of studies with respect to the descriptors, they can be seen through the sludge then conceptual map in Figure 1.

**Figure 1** - Distribution of studies according to list of descriptors



Source: Researcher's data, 2015.

The conceptual map facilitates the understanding of the contents found in the articles showing that adverse events and related factors can be used as a management tool of nursing care.

Currently, the quality of care and patient safety has been widely discussed, so we can relate to these adverse events. The AES' identification has a paramount importance that prevention strategies are established in order to minimize these occurrences.

Thus, it is important to notice that these events can be avoided.

The implementation of a safety culture in health institutions, whose focus is to seek systemic and not guilty to punish faults, is one of the key strategies proposed by organizations whose mission is to improve the quality of care. With this approach, the anonymous registration of AE is considered fundamental action in obtaining fault information that will enable the implementation of proactive measures to reduce the number of occurrences.<sup>21</sup>

Opposing to the recommendations directed to non-punitive culture practice, a study noted that most nurses reported the presence of punishments for professionals in ICUs, highlighting the verbal warning, as the type of most prevalent punishment, followed by more severe punishments such as suspension and dismissal. Thus, professionals fearing being punished do not report adverse events, prevailing underreporting, thus hindering the actual identification of problems and consequently the implementation of preventive measures, favoring the prevalence of AEs.<sup>22</sup>

The main causes for the occurrence of AES are attributed to human failures, and these failures are closely linked to the work overload.<sup>23</sup>

It should be noted that often the nursing staff concentrates more than a job, has high turnover against the usually low-paid post or working conditions in the institution and high level of stress.<sup>24</sup> In this sense, nursing is known as one of the most stressful professions, and it can also be related to the fact of having to deal with people who need their care in full.<sup>25</sup>

The analysis carried out in two public neonatal units in São Luís (MA) demonstrated an association between the number of newborns classified according to the demand for care (RCDs) by a nurse or nursing assistant and adverse events: the higher the ratio between the number of RCDs and the number of nurses or nursing assistants, the greater the risk of adverse events. This association is plausible, then it is expected that the greater the number of patients under observation, worse contrived will be the quality of care. These results extend the intensive care units for adults.<sup>26</sup>

The workload related to the disproportion between the number of nurses and patients is reported as a risk factor including the increased incidence of nosocomial infections in critically ill patients.<sup>24</sup>

Thus we can see that the workload is not only related to the excessive workload due to multiple jobs, as well as to staff size, ie, inadequate nursing framework compromises the quality of care provided to patients in intensive care.

The long working hours, excessive pace beyond the physical efforts along with an environment with critical patients who require care, are many elements that favor the occurrence of failures in patient care by professional staff.<sup>27</sup>

One of the main adverse events cited in the studies were medication errors, these can happen from the prescriber, pharmacy dispensing, and administration. With regard to administration, this can dose-related, in time, to the right patient, among others.

Speaking further about the medication errors, we can mention drug interactions, polypharmacy should also be considered, since the concomitant administration of various drugs leads to occurrences of drug interactions, which in turn can bring harm to patients.

Drug interactions are more frequent in individuals aged over 60 years, being individuals, in most cases, patients with chronic diseases and, consequently, use wide variety of drugs. Also attaches itself to greater susceptibility of the elderly to present drug interactions to the deterioration of liver and kidney function, as well as to reduce the metabolism and elimination of drugs.<sup>28</sup>

In the hospital setting, most of these occurrences is imputed to nursing professionals, as a routine practice of the team, though the medication error is the multidisciplinary team responsibility.<sup>29</sup>

Population aging brings, consequently, decreased mortality and increased morbidity, with the onset of chronic diseases, which in a situation of acute exacerbation can lead the elderly to ICU stay. In addition, aging is associated with decreased physiological reserves and increased risk for development of disease.<sup>20</sup>

In this perspective, we can say that the elderly are most suffering EAs, because they are affected by chronic diseases and are hospitalized more often by the high number of prescription drugs and the fragility of the systems.

This expression can be confirmed by a study conducted in order to characterize the EAs in ICUs, semi-intensive Units and Inpatient Units, and noted that the most affected age group was the age over 61 years, corresponding to 77.7 % of patients involved in the research.<sup>27</sup>

Another study found that among 151 patients who were admitted to the ICU of a university hospital with hospital stay more than four days, 114 (77%) developed nosocomial infections, demonstrating that prolonged hospitalization constitute a risk factor for the development of infections.<sup>30</sup> Most patients go through invasive procedures such as bladder probes delay, mechanical ventilation and central venous catheters, demonstrating the high level of use of these procedures in intensive care.

Adverse events increases the number of days of hospital stay and therefore the costs and reduces the quantity of vacancies available for other patients requiring the same type of assistance.

## CONCLUSION

Through the bibliometric study, it was possible to identify scientific productions related to adverse events in ICUs in the past 10 years, identifying more quantitative studies related to the theme in the Digital Library of Theses and Dissertations of USP. The database that stood out was the Scielo, with a significant concentration in the Southeast region of Brazil. It emphasizes the predominance of works published by nursing, especially AEs related to medication errors and nosocomial infection, intensified by work overload.

It was noted the absence of other professional publications, since the patient is assisted by a multidisciplinary team, and all of these are likely to make mistakes. It is recommended to conduct research involving multidisciplinary team, paying attention also to the iatrogenic that can lead to behavioral and psychological damage.

It is essential to implement care protocols in order to systematize the conduct and technical procedures, to improve the quality of care.

The study has limitations as the small number of publications on the subject. Thus, the shortage of publications concerning the topic in question hampers updates on the subject.

These results highlight the importance of further research in order to broaden the discussions on the subject, and consequently extinguish or at least minimize the occurrence of these events.

When evaluating researched scientific articles related to iatrogenic, we observe in the work the great importance of the nurse to know the risk factors and put them into practice with preventive measures.

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Received on: 15/04/2016

Reviews required: No

Approved on: 19/09/2016

Published on: 10/07/2017

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